

# SHARP SERVICE MANUAL

CODE:00ZER1921SM2E

## ELECTRONIC CASH REGISTER

No.2: Hardware manual

**ER-1911** (Europe Ver.)  
**ER-1921**  
**ER-2386** (U.S.A. Ver.)  
**MODEL ER-2396**

SRV Key :LKGIM7113RCZZ

### CONTENTS

|  | Page |
|--|------|
| I. ER-1911/ER-2386 .....                       | 1    |
| 1. TEST FUNCTION (ER-1911/ER-2386) .....       | 1    |
| 2. CIRCUIT DESCRIPTION (ER-1911/ER-2386) ..... | 5    |
| 3. CIRCUIT DIAGRAM (ER-1911/ER-2386) .....     | 12   |
| II. ER-1921/ER-2396 .....                      | 15   |
| 1. TEST FUNCTION (ER-1921/ER-2396) .....       | 15   |
| 2. CIRCUIT DESCRIPTION (ER-1921/ER-2396) ..... | 19   |
| 3. CIRCUIT DIAGRAM (ER-1921/ER-2396) .....     | 28   |
| III. INSTALLATION MANUAL FOR OPTIONS .....     | 32   |

## I. ER-1911/ER-2386

### 1. TEST FUNCTION (ER-1911/ER-2386)

#### 1-1. Start of test function

The following key operation is required in the SRV1 mode to start the test

XXXX → [RF] or [RFND]  
— Test command

[RF] key : ER-1911

[RFND] key : ER-2386

#### 1-2. List of test command

| No. | Description                              | Key operation          |
|-----|--|------------------------|
| 1   | Mode switch test                         | 1 → [RF] or [RFND]     |
| 2   | Key test                                 | XXX02 → [RF] or [RFND] |
| 3   | Display test                             | 3 → [RF] or [RFND]     |
| 4   | Buzzer test                              | 4 → [RF] or [RFND]     |
| 5   | Receipt ON/OFF switch test               | 5 → [RF] or [RFND]     |
| 6   | Drawer open test (with option installed) | 6 → [RF] or [RFND]     |
| 7   | Printer test                             | 7 → [RF] or [RFND]     |
| 8   | RAM test                                 | 8 → [RF] or [RFND]     |
| 9   | Key position code test                   | 9 → [RF] or [RFND]     |
| 10  | Sequential test                          | XXX11 → [RF] or [RFND] |

XXX : Sum check data for standard key layout

ER-1911(5DEPT.)=22

ER-1911(10DEPT.)=213

ER-2386=237

#### 1-3. Test description

##### 1) Test No.1 : Mode switch test

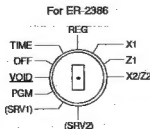
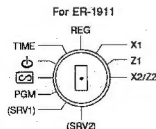
###### ① Key operation

1 → [RF] or [RFND]

Then, turn the mode switches in the following order.

| Mode switch operation | Display |
|-----------------------|---------|
| SRV1                  | /       |
| PGM                   | /       |
| [CA] or VOID          | /       |
| ⊕ or OFF              | 4       |
| TIME                  | /       |
| REG                   | /       |
| X                     | /       |
| Z                     | /       |
| X2/Z2                 | /       |

Mode switch position layout



##### ② Description

As the mode switch position number is displayed, check the number.

##### ③ Termination

The mode can be terminated when the mode switch is turned to the SRV1 side from other position.

Termination print :           1            
Error print :           1E          

#### 2) Test No.2 : Key test

##### ① Key operation

XXXX 02 → [RF] or [RFND]  
— Test command  
— Sum check data

Enter the test command in succession to the sum check data of the model.

| Model             | Sum check data |
|-------------------|----------------|
| ER-1911 : 5DEPT.  | 22*            |
| ER-1911 : 10DEPT. | 213*           |
| ER-2386 : 10DEPT. | 237*           |

\* NOTE : Sum check data

The checksum is a decimal number obtained by converting low two digits of the hard code hexadecimal total of all keys. The [TL] or [CA/AT] keys are exception.

\* Next, push every key on the keyboard except for the receipt and journal keys.

When the [TL] or [CA/AT] key is depressed, the termination printout is immediately produced assuming that all keys have been depressed.

There is no order in which the keys have to be depressed.

\* Keyboard position code of model vs. key layout

[All key position code]

|    |    |    |    |    |
|----|----|----|----|----|
| A2 | 12 | 04 | 02 | 03 |
|----|----|----|----|----|

|         |          |          |       |
|---------|----------|----------|-------|
| ↑ R ↑ J | 41 42 72 | A3 32 14 | 02 01 |
| 43 44   | 92 82 73 | A4 B2 13 | 03 22 |
| 54 53   | 93 83 74 | A1 B4 34 | 11 24 |
| 52 63   | 81 94 84 | 71 B3 33 | 23    |
| 51 62   | 61 64    | 91 B1 31 | 21    |

[ER-1911]

5 DEPT.

|    |    |    |
|----|----|----|
| A2 | 12 | 02 |
|----|----|----|

|         |          |    |    |
|---------|----------|----|----|
| ↑ R ↑ J | 41 42 72 | 32 | 01 |
| 43 44   | 92 82 73 | B2 | 22 |
| 54 53   | 93 83 74 | B4 | 24 |
| 52 63   | 81 94 84 | B3 | 23 |
| 51 62   | 61 64    | B1 | TL |

10 DEPT.

|    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|
|    |    | A2 |    | 12 | 02 |    |    |
| ↑  | ↑  | 41 | 42 | 72 | 32 | 14 | 01 |
| R  | J  | 92 | 82 | 73 | B2 | 13 | 22 |
| 43 | 44 | 93 | 83 | 74 | B4 | 34 | 24 |
| 54 | 53 | 81 | 94 | 84 | B3 | 33 | 23 |
| 52 | 63 |    | 61 | 64 | B1 | 31 | TL |
| 51 | 62 |    |    |    |    |    |    |

[ER-2386]

|    |    |    |    |    |    |    |       |
|----|----|----|----|----|----|----|-------|
|    |    | A2 |    | 12 | 04 | 02 | 03    |
| ↑  | ↑  | 41 | 42 | 72 | 32 | 14 | 01    |
| R  | J  | 92 | 82 | 73 | B2 | 13 | 22    |
| 43 | 44 | 93 | 83 | 74 | B4 | 34 | 11 24 |
| 54 | 53 | 81 | 94 | 84 | B3 | 33 | 23    |
| 52 | 63 | 61 | 64 |    | B1 | 31 | CA/AT |
| 51 | 62 |    |    |    |    |    |       |

② Description

Until the depression of the [TL] or [CA/AT] key, the sum of key position codes is compared with the sum check data, except for the [TL] or [CA/AT] key.

③ Display

2 5 - 1

- Display the hard code of the key pressed.
- High and low digits of the hard code are separated with a hyphen "-".
- If the hard code value is A or B, it will be converted into decimal equivalent and displayed.

A → 10  
B → 11

④ Termination

The test terminates with the depression of the [TL] or [CA/AT] key and the termination printout is produced.

Termination print : | 2 |  
Error print : | ----- 2 E |

3) Display test

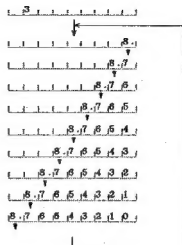
① Key operation

3 → [RF] or [RFND]

② Description

The display pattern is kept displayed in the given interval after the test mode was established.  
Press any key to cancel the test mode. In this event, the display returns to the initial message display.

• Display



③ Termination print : | 3 |

4) Test No.4 : Buzzer test

① Key operation

4 → [RF] or [RFND]

- ② A continuous beep will be issued when in this mode. Press any key to cancel the test mode. The beeper will then be turned off.

• Display

4

③ Termination print : | 4 |

5) Test No.5 : Receipt ON/OFF test

① Key operation

5 → [RF] or [RFND]

② Description

The following is displayed according to the location of the receipt on/off switch.

Display : 5 0 Receipt on (contacts open)  
5 C Receipt off (contacts closed)

③ Termination

With depression of any key.

Print out : | 5 |

6) Test No.6 : Drawer open test

① Key operation

6 → [RF] or [RFND]

② Description

With this test, the drawer opens and its state is displayed in the following manner.

Display : 6 0 Drawer open  
6 C Drawer close

For the model with the drawer open sensor, check that the display shows "O" when the drawer opens, and "C" when it closes.

For the model without the drawer open sensor, check that the display always shows "C".

- ③ Termination  
With depression of any key.  
Print out : | 6 |

# 7) Test No.7 : Printer test

- ① Key operation

7 → [RF] or [RFND]

- ② Description

Receipt switch in the position OFF: Continuous printing is done.

Receipt switch in the position ON : After a cycle of printing, the operation terminates automatically.

Display : | 7 |

- ③ Termination

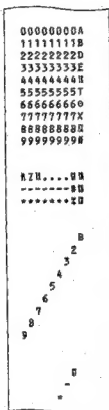
When the receipt switch is turned from OFF to ON position while printing is continuing, the test terminates after a cycle of printing.

[A continuous print example]

ER-2388



ER-1811



# 8) Test No.8 : RAM test

- ① Key operation

8 → [RF] or [RFND]

- ② Description

After writing the following data in the RAM, the data is checked by reading the RAM.

If an error occurs, the operation ends with the termination error printout.

The application will handle it as address 0000H-3FFFH and 4-bit data by the handler and converted to the address 0000H-1FFFH and 8-bit data.

NOTE: The data in the RAM is cleared by this test.

Perform a master reset function after this test is completed.

Address vs. data

|         | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 0 1 X | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 0 2 X | F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E |
| 0 0 4 X | E | F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D |
| 0 0 8 X | D | E | F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C |
| 0 1 0 X | C | D | E | F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B |
| 0 2 0 X | B | C | D | E | F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A |
| 0 4 0 X | A | B | C | D | E | F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 8 0 X | 9 | A | B | C | D | E | F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 0 0 X | 8 | 9 | A | B | C | D | E | F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2 0 0 X | 7 | 8 | 9 | A | B | C | D | E | F | 0 | 1 | 2 | 3 | 4 | 5 | 6 |

The write data to other address will be 0.

Display : | 8 |

- ③ Termination

| 8 | | ----- 8 E |  
Normal termination print out Error print out

# 9) Test No.9 : Key position code test

- ① Key operation

9 → [RF] or [RFND]

- ② Description

Shows the hard code of the key pressed, except for the [TL] or [CAAT] key.

Press the [TL] or [CAAT] key to cancel this test mode.

- Display

| 8 | | | | | | | | | | Indicates the hard code of the key depressed.

High and low digits of the hard code are separated with a hyphen "-".

If the hard code value is A or B, it will be converted into decimal equivalent and displayed.

- ③ Termination

Print out : | 9 |

# 10) Test No.10 : Sequential test

- ① Key operation

XXX 10 → [RF] or [RFND]

Sum check data

- ② Description

Checksum for the keyboard test is similar as the Job#02, is a decimal number obtained by converting low two digits of the hard code hexadecimal total of all keys. With this test, test items 1-8 are executed in succession. The basic print pattern, however, is used for the printer aging test of item 7.

The basic print pattern will be printed just for once, regardless of the receipt switch position.

Termination print (or error print) will be obtained every time a test has completed before going to a next test.

After completion of the test item 8, the stamp is printed and a receipt is issued and the sequential test terminates.



## 2. CIRCUIT DESCRIPTION (ER-1911/2386)

### Circuit block diagram

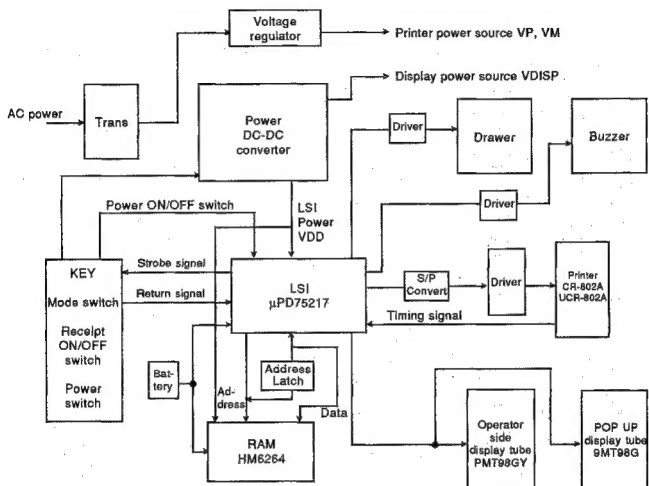


Fig. 2-1

2-1.  $\mu$ PD75217 Terminal signal

| No. | Name   | Description                                 | I/O    |
|-----|--------|---|--------|
| 1   | S3     | Key strobe/Display tube segment signal (d)  | out    |
| 2   | S2     | Key strobe/Display tube segment signal (c)  | out    |
| 3   | S1     | Key strobe/Display tube segment signal (b)  | out    |
| 4   | S0     | Key strobe/Display tube segment signal (a)  | out    |
| 5   | PC0    | Power off signal                            | in     |
| 6   | P01    | Print data shift clock output               | out    |
| 7   | P02    | Print data output                           | out    |
| 8   | P03    | Key return signal                           | in     |
| 9   | U      | Printer timing signal input                 | in     |
| 10  | P11    | Key return signal                           | in     |
| 11  | F12    | Key return signal                           | in     |
| 12  | F13    | Key return signal                           | in     |
| 13  | -CS1   | RAM chip select signal                      | out    |
| 14  | -WE    | RAM write signal                            | out    |
| 15  | P22    | Printer motor on signal                     | out    |
| 16  | P23    | Drawer open signal                          | out    |
| 17  | P30    | Mode switch return                          | in     |
| 18  | P31    | Key return signal                           | in     |
| 19  | P32    | Address latch enable for RAM                | out    |
| 20  | A12    | RAM Address bus A12                         | out    |
| 21  | A8     | RAM Address bus A8                          | out    |
| 22  | A9     | RAM Address bus A9                          | out    |
| 23  | A11    | RAM Address bus A11                         | out    |
| 24  | A10    | RAM Address bus A10                         | out    |
| 25  | D7/A0  | Data bus D2/Address bus A10                 | in/out |
| 26  | D6/A1  | Data bus D1/Address bus A1                  | in/out |
| 27  | D5/A4  | Data bus D0/Address bus A4                  | in/out |
| 28  | D4/A2  | Data bus D7/Address bus A2                  | in/out |
| 29  | PP0    | Buzzer signal                               | out    |
| 30  | X1     | X'tal terminal 4.19MHz                      | in     |
| 31  | X2     | X'tal terminal 4.19MHz                      | in     |
| 32  | VSS    | GND   | in     |
| 33  | XT1    | Timer X'tal terminal 32.768KHz              | in     |
| 34  | XT2    | Timer X'tal terminal 32.768KHz              | in     |
| 35  | D0/A7  | Data bus D0/Address bus A7                  | in/out |
| 36  | D1/A6  | Data bus D1/Address bus A6                  | in/out |
| 37  | D2/A5  | Data bus D2/Address bus A5                  | in/out |
| 38  | D3/A3  | Data bus D3/Address bus A3                  | in/out |
| 39  | -RESET | Reset signal input                          | in     |
| 40  | T0     | Display tube 1st digit drive signal         | out    |
| 41  | T1     | Display tube 2nd digit drive signal         | out    |
| 42  | T2     | Display tube 3rd digit drive signal         | out    |
| 43  | T3     | Display tube 4th digit drive signal         | out    |
| 44  | T4     | Display tube 5th digit drive signal         | out    |
| 45  | T5     | Display tube 6th digit drive signal         | out    |
| 46  | T6     | Display tube 7th digit drive signal         | out    |
| 47  | T7     | Display tube 8th digit drive signal         | out    |
| 48  | T8     | Display tube 9th digit drive signal         | out    |
| 49  | T9     | NU  |        |
| 50  | PH3    | NU  |        |
| 51  | PH2    | NU  |        |
| 52  | PH1    | Printer magnet data output enable signal    | out    |
| 53  | PH0    | Printer magnet data strobe signal           | out    |
| 54  | S11    | Key strobe signal                           | out    |
| 55  | S10    | Key strobe signal                           | out    |
| 56  | Vload  | Power (-20V) for display                    | in     |
| 57  | Vpre   | Power (-4V) for display                     | in     |
| 58  | S9     | Key strobe signal                           | out    |
| 59  | S8     | Key strobe signal, Display tube segment (▼) | out    |
| 60  | S7     | Key strobe/Display tube segment (DP) signal | out    |
| 61  | S6     | Key strobe/Display tube segment signal (g)  | out    |
| 62  | S5     | Key strobe/Display tube segment signal (f)  | out    |
| 63  | S4     | Key strobe/Display tube segment signal (e)  | out    |
| 64  | VDD    | Power (+5V)                                 | in     |

## 2-2. Circuit description

### 1) RAM Read/write circuit

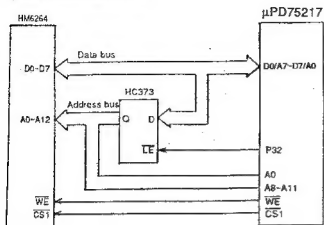
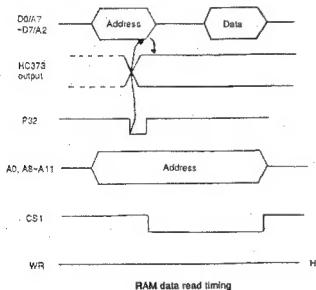
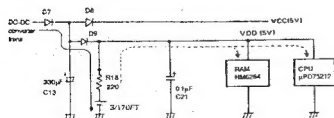


Fig. 2-2

Since the 8-bit data bus of the  $\mu$ PD75217 shares the same lines with the 8-bit address bus of the HM6264, selection of the RAM chip by the  $\mu$ PD75217 causes the HC373 to latch the 8-bit address when P32 of  $\mu$ PD75217 is inputted.



### 2) Battery Circuit



— : Battery recharge current  
 - - - : Battery discharge circuit

Fig. 2-3

### 3) P-OFF Circuit

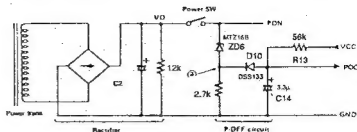


Fig. 2-4

#### At power on

When P-ON voltage reaches 16V, the current flows through the zener diode (MTZ16B) so that the level at point @ goes high. The level of P-OFF rises as VCC increases. As a result, the P-OFF signal changes from low to high level.

#### At power off

When the power is turned off, the P-ON voltage drops under 15V causing the zener diode to stop current flow, which causes potential at point @ to drop.

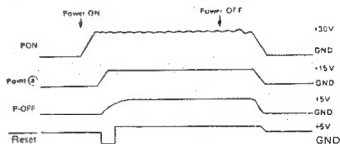


Fig. 2-5

### 4) Key and switch

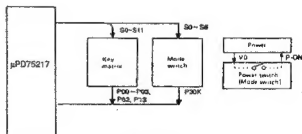


Fig. 2-6

S0-S11 : Key scan signal  
 P03, P11-P13 : Key return signal  
 VO : Power switch  
 P-ON : Mode switch  
 P30K : Mode switch  
 Return signal

## 5) Display control

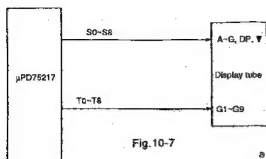


Fig.10-7

a-g: Display segment  
 DP: Decimal point  
 $\nabla$ : Indicator



Fig. 2-7

# 6) Printer control

## Block diagram

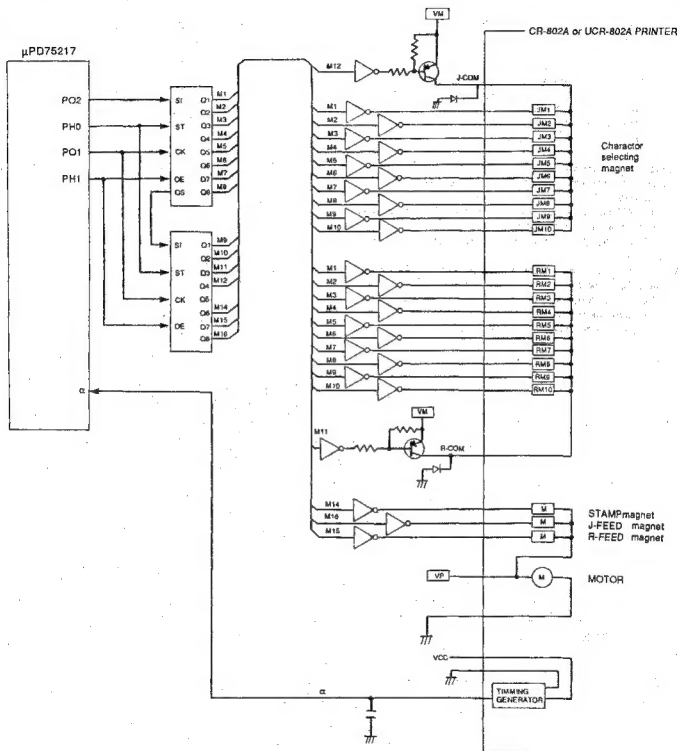
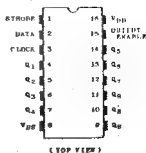


Fig. 2-8

PO2 : Print data output (serial output)  
 PO1 : Print data shift clock  
 PH0 : Printer magnet data strobe signal  
 PH1 : Printer magnet data output enable signal  
 M1 :  
 : Print magnet drive signal  
 M10 :  
 VP : Printer power  
 α : Printer timing signal  
 M11 : Receipt side magnet common  
 M12 : Journal side magnet common  
 M14 : STAMP drive  
 M15 : Receipt feed  
 M16 : Journal feed

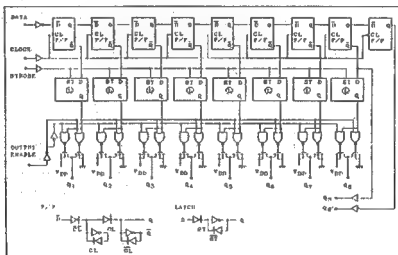
TC4094 internal circuit



### Printer control procedure

Printer is controlled mainly with CPU signals PH0, PH1, PO1, PO2, α, and P22.

- 1) Make P22 high to drive the motor with the CPU. This activates VP to rotate the printer motor.
- 2) α (Timing Signal) from the printer allows output of the first line print data.
- 3) Print data is outputted serial-parallel converted in TC4094 and internally latched by the strobe signal of PH0.  
When PH1 output enable signal is inputted. The latched data is outputted as M1-M16.
- 4) The next α is detected and procedure 3) is repeated.



Timing

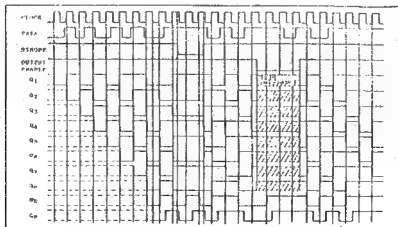
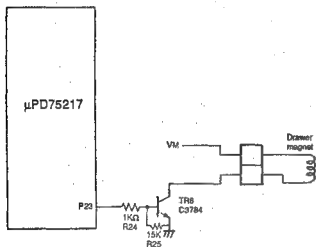


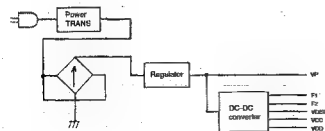
Fig. 2-9

### 8) Drawer magnet drive



The drawer magnet is driven when P23 of the  $\mu$ PD75212 changes from low to high state

(1) Block diagram



|          |            |
|----------|------------|
| VP       | : +20V     |
| VF1, VF2 | : -4.3V AC |
| VDISP    | : -25V     |
| VCC      | : +5V      |
| VDD      | : +5V      |

(2) Regulator circuit

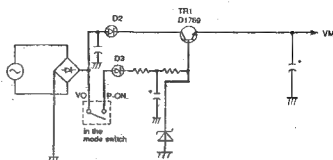
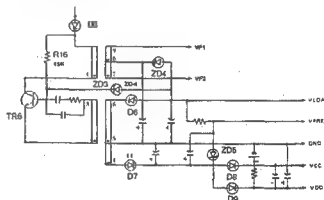


Fig. 2-12

- 1) If VO-P-ON was not shorted within the mode switch (power off), TR1 remains inactive as no voltage is applied to the base of TR1.
- 2) If VO-P-ON was shorted, TR1 goes active as voltage is added to the base of TR1.
- 3) With activation of TR1, the voltage VM begins to increase.

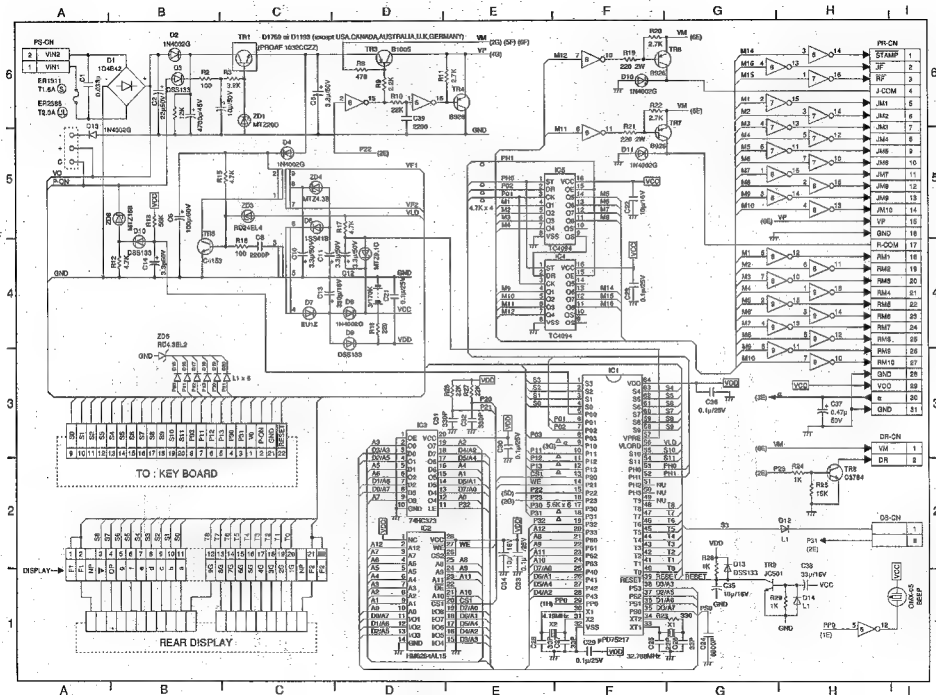
### (3) DC-DC converter



**Fig. 2-13**

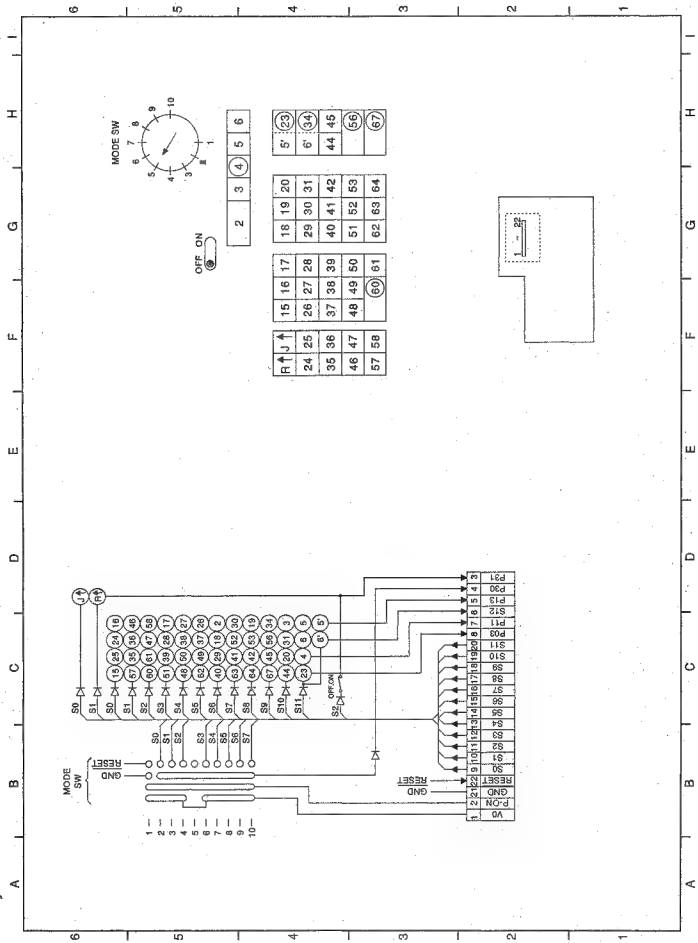
The bias is added to the base of TR5 when the power switch is turned on, so that TR5 starts self-oscillation. VLOAD from the secondary side is fed back through the zener diode ZD3 to suppress voltage fluctuation on the secondary side.

## - 12 -

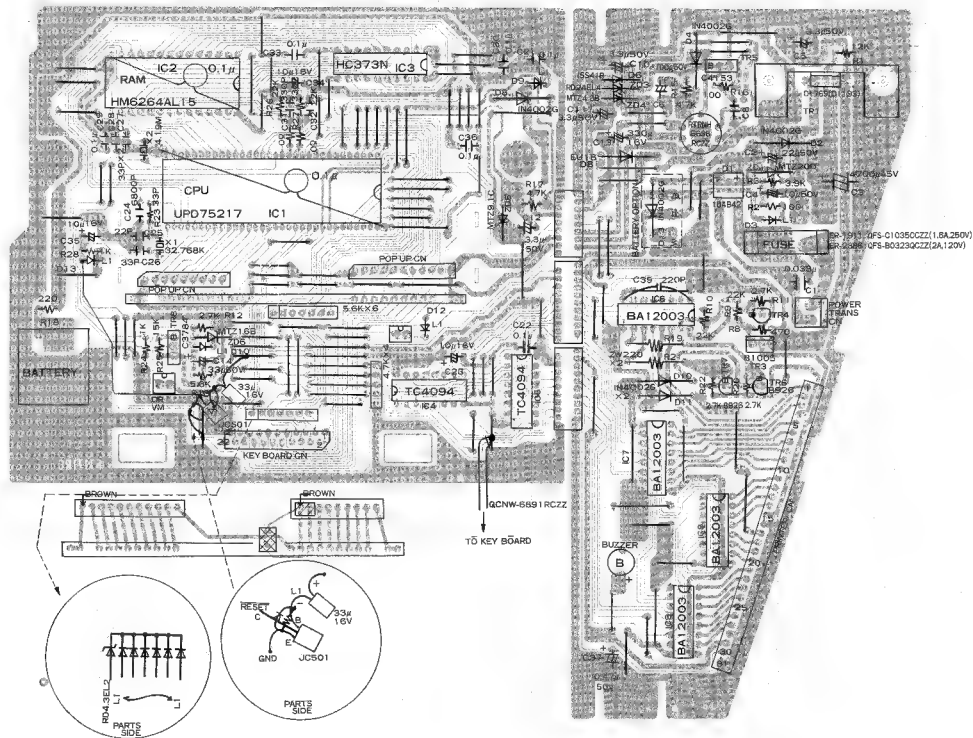


As

### 3-2 Keyboard circuit



### 3-3 Main PWB layout





[ER-1921]

Fig. 2

Fig. 2

| ↑  | ↑  |    |    |    |    |    |    |    |    |  |  |
|----|----|----|----|----|----|----|----|----|----|--|--|
| R  | J  |    |    |    |    |    |    |    |    |  |  |
| 2F | 1F | 0F | 3F | 32 | 25 | 37 | 19 | 3C | 0A |  |  |
|    |    | 34 | 33 | 22 | 15 | 36 | 29 | 2C | 38 |  |  |
| 10 | 20 | 24 | 23 | 12 | 05 | 16 | 17 |    | 18 |  |  |
| 30 | 21 | 03 | 14 | 13 | 02 | 26 | 27 |    | 28 |  |  |
| 00 | 31 |    | 01 | 11 | 04 | 06 | 07 |    | TL |  |  |

[ER-2396]

Fig. 3

Fig. 3

|    |   |    |  | 3D | 35 | 39 | 1A | 3A | 2A    |
|----|---|----|--|----|----|----|----|----|-------|
|    | ↑ | ↑  |  |    |    |    |    |    |       |
| R  |   | J  |  |    |    |    |    |    |       |
| 2F |   | 1F |  | 0F | 3F | 32 | 25 | 37 | 19    |
|    |   |    |  | 34 | 33 | 22 | 15 | 36 | 29    |
| 10 |   | 20 |  | 24 | 23 | 12 | 05 | 16 | 17    |
|    |   |    |  | 03 | 14 | 13 | 02 | 26 | 27    |
| 30 |   | 21 |  |    |    |    | 04 | 06 | 07    |
|    |   |    |  |    |    |    |    |    |       |
| 00 |   | 31 |  |    | 01 | 11 |    | 3C | 0A    |
|    |   |    |  |    |    |    |    | 2C | 38    |
|    |   |    |  |    |    |    |    | 09 | 18    |
|    |   |    |  |    |    |    |    |    | 28    |
|    |   |    |  |    |    |    |    |    | CA/AT |

## ② Description

Until the depression of the [TL] or [CA/AT] key, the sum of key position codes is compared with the sum check data, except for the [TL] or [CA/AT] key.

## ③ Termination

The test terminates with the depression of the [TL] or [CA/AT] key and the termination printout is produced.

Termination printout 02

Termination printout with error 02E

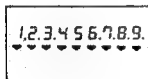
## 3) Test No. 3: Display buzzer test

## ① Key operation

3 → [TL] or [CA/AT]

## ② Description

Continuous beeps and display are tested.



State of display

## ③ Termination

The beep stops with any key depression and the display returns to show 0.00

Termination print 03

## 4) Test No. 4: Receipt on/off switch test

## ① Key operation

4 → [TL] or [CA/AT]

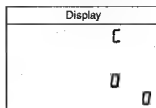
## ② Description

The following is displayed according to the location of the receipt on/off switch.

Receipt off (contacts closed)

Receipt on (contacts open)

End



## ③ Termination

With depression of any key, the display shows 0.00

Termination print 04

## 5) Test No. 5: Drawer open test (Must have drawer open sensor kit installed)

## ① Key operation

X → [TL] or [CA/AT]

| X | Test description    |
|---|---------------------|
| 5 | Standard drawer : A |
| 6 | Option drawer : B   |
| 7 | Option drawer : D   |
| 8 | Option drawer : E   |

## ② Description

With this test, the drawer opens and its state is displayed in the following manner:

Drawer open → 0

Drawer closed → C

"C" is displayed for the model that has no drawer sensor switch.

## ③ Termination

With depression of any key, the display shows 0.00

Termination print 0X  
— Test No. 5, 6, 7, 8

## 6) Test No. 6: Continuous print test

## ① Key operation

9 → [TL] or [CA/AT]

## ② Description

Receipt switch at OFF: Continuous printing is done.

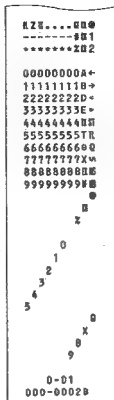
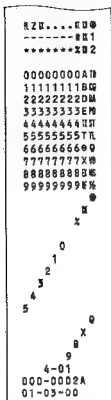
Receipt switch at ON: After a cycle of printing, the operation terminates automatically.

### ③ Termination

When the receipt switch is turned from OFF to ON position while printing is continuing, the test termination after a cycle of printing.

FR-2396

FR-1921



### 7) Test No. 7: ROM test

#### ① Key operation

CPU internal system ROM (0000H ~ 0FFFFH)

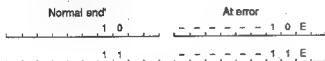
10 → TL or CA/AT

CPU internal application ROM (8000H ~ FF7FH)

11 → TL or CA/AT

#### ② Test results

Termination print



### 8) Test No. 8: RAM test

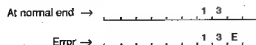
#### ① Key operation

#### ② Description

Though read/write test is conducted from the address 60000H to 7FFFH, the data is secured by saving it before the test starts.

#### ③ Test results

Termination print



NOTE: If the CPU internal software timer interrupt was received in a course of data write or read (verify) during this test mode, it may affect the data and an error may occur. Since the problem could occur only with this test program, there is no problem to the application software.

### 9) Test No. 9: Key position code read test

#### ① Key operation

#### ② Description

Key position of a key on the keyboard is displayed when any key is depressed. (Hardware key contacts code. A hexadecimal number is converted into a decimal number before display.)

The receipt and journal keys only feed paper without displaying, and the TL or CA/AT key is used to terminate the test.

For key position codes display, refer to Fig.1 to 8.

#### ③ Termination

Push the TL or CA/AT key.

Termination print

14

### 10) Test No. 9: Sequential test-1

#### ① Key operation

X, X, X, X, 00 → TL or CA/AT

Refer to 2) test No.2 for the sum check data.

#### ② Description

Within one second after the key operation, the test nos 1 thru 8, are able to carry out continuously.

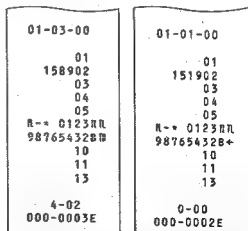
NOTE-1: If a drawer sensor is equipped for test No. 5, the control proceeds to a next step when the drawer is closed after it was opened. If the sensor is not equipped, the control jumps to a next step assuming it has no drawer installed.

NOTE-2: Simple print is done for the continuous print test of test No. 6.

[A print example after the test]

FR-2396

FR-1921



The upper four digits shows the sum of key position codes which have been pressed in the key switch test.

#### ③ Termination

All tests automatically terminate upon finishing the stamp test.

11) Test No. 11: Sequential test-2

① Key operation

X | X | X | X    22 → TL or CA/AT

Refer to 2) test No.2 for the sum check data.

② Description

It is similar as the test No. 10 except that it ignores the drawer open test No. 5.

## 2. CIRCUIT DESCRIPTION (ER-1921/ER-2396)

### Circuit block diagram

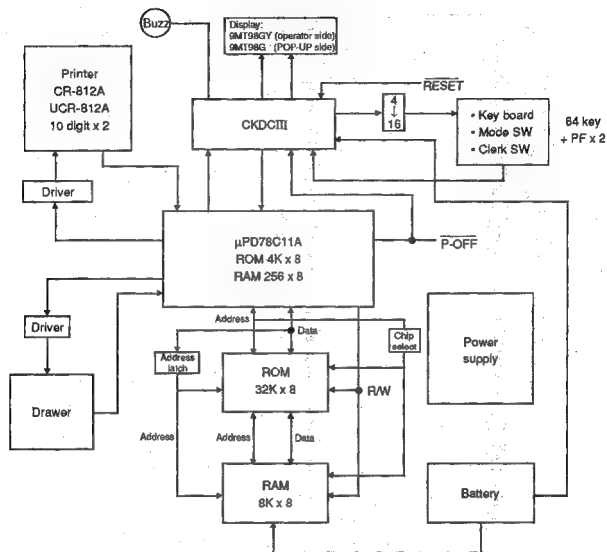


Fig. 2-1

## 2-2. CPU pin description

### 1) CPU ( $\mu$ PD78C11A)

The  $\mu$ PD78C11A is a single chip microprocessor which has an internal ROM, RAM, and serial I/O.

#### Pin configuration

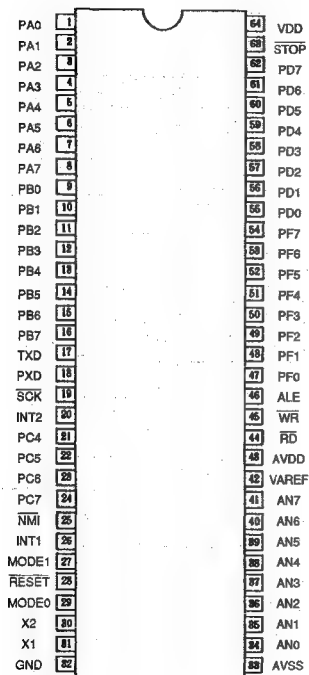


Fig. 2-2

## 2) Signal description

| Pin No. | Port name | Signal name | I/O | Description                             |
|---------|-----------|-------------|-----|---|
| 1       | PA0       | MG10 & DRA  | O   | Printer magnet 10 & rawer open signal A |
| 2       | PA1       | MG9 & DRB   | O   | Printer magnet 9 & rawer open signal B  |
| 3       | PA2       | MG8 & DRD   | O   | Printer magnet 8 & rawer open signal D  |
| 4       | PA3       | MG7 & DRE   | O   | Printer magnet 7 & rawer open signal E  |
| 5       | PA4       | MG6         | O   | Printer magnet 6                        |
| 6       | PA5       | MG5         | O   | Printer magnet 5                        |
| 7       | PA6       | MG4         | O   | Printer magnet 4                        |
| 8       | PA7       | MG3         | O   | Printer magnet 3                        |
| 9       | PB0       | MG2         | O   | Printer magnet 2                        |
| 10      | PB1       | MG1         | O   | Printer magnet 1                        |
| 11      | PB2       | R-COM       | O   | Receipt common signal                   |
| 12      | PB3       | J-COM       | O   | Journal common signal                   |
| 13      | PB4       | R-FEED      | O   | Receipt feed signal                     |
| 14      | PB5       | J-FEED      | O   | Journal feed signal                     |
| 15      | PB6       | STAMP       | O   | Stamp signal                            |
| 16      | PB7       | MOTORDRIVE  | O   | Motor drive signal                      |
| 17      | TXD       | HTS         | O   | 8-bit serial output (CKDCIII)           |
| 18      | RXD       | STH         | I   | 8-bit serial input (CKDCIII)            |
| 19      | SCK       | SCK         | I   | Shift clock (CKDCIII)                   |
| 20      | INT2      | SHEN        | I   | Shift enable (CKDCIII)                  |
| 21      | PC4       | SCK         | O   | Shift clock (CKDCIII)                   |
| 22      | PC5       | IRQ         | I   | Interrupt request to host               |
| 23      | PC6       | STOP        | O   | System reset request signal             |
| 24      | PC        | P-OFF       | O   | Power off signal                        |
| 25      | NMI       | VCC         | I   | Not used                                |
| 26      | INT1      | $\alpha$    | I   | $\alpha$ signal                         |
| 27      | MODE1     | VCC pull up | I   | VCC pull up signal                      |
| 28      | RESET     | SRES        | I   | Reset input                             |
| 29      | MODE0     | GND         | I   | GND                                     |
| 30      | X2        | X2          | -   | 12MHz oscillator                        |
| 31      | X1        | X1          | -   | 12MHz oscillator                        |
| 32      | VSS       | GND         | I   | GND                                     |
| 33      | AVSS      | GND         | I   | GND                                     |
| 34      | AN0       | DS          | I   | Drawer sensor                           |
| 35      | AN1       | NU          | I   |   |
| 36      | AN2       | NU          | I   | Not used                                |
| 37      | AN3       | NU          | I   |   |
| 38      | AN4       | NU          | I   |   |
| 39      | AN5       | NU          | I   |   |
| 40      | AN6       | NU          | I   |   |
| 41      | AN7       | NU          | I   |   |
| 42      | VAREF     | VDD         | I   | VDD                                     |
| 43      | AVDD      | VDD         | I   | VDD                                     |
| 44      | RD        | RD          | O   | Read signal                             |
| 45      | WR        | WR          | O   | Write signal                            |
| 46      | ALE       | ALE         | O   |   |
| 47      | PF0       | AB8         | O   | Address bass, A8                        |
| 48      | PF1       | AB9         | O   | Address bass, A9                        |
| 49      | PF2       | AB10        | O   | Address bass, A10                       |
| 50      | PF3       | AB11        | O   | Address bass, A11                       |
| 51      | PF4       | AB12        | O   | Address bass, A12                       |
| 52      | PF5       | AB13        | O   | Address bass, A13                       |
| 53      | PF6       | AB14        | O   | Address bass, A14                       |
| 54      | PF7       | AB15        | O   | Address bass, A15                       |
| 55      | PD0       | DB0/AB0     | I/O | Address bass, A0 Data bass, D0          |
| 56      | PD1       | DB1/AB1     | I/O | Address bass, A1 Data bass, D1          |
| 57      | PD2       | DB2/AB2     | I/O | Address bass, A2 Data bass, D2          |
| 58      | PD3       | DB3/AB3     | I/O | Address bass, A3 Data bass, D3          |
| 59      | PD4       | DB4/AB4     | I/O | Address bass, A4 Data bass, D4          |
| 60      | PD5       | DB5/AB5     | I/O | Address bass, A5 Data bass, D5          |
| 61      | PD6       | DB6/AB6     | I/O | Address bass, A6 Data bass, D6          |
| 62      | PD7       | DB7/AB7     | I/O | Address bass, A7 Data bass, D7          |
| 63      | STOP      | VCC         | I   | VCC                                     |
| 64      | VDD       | VCC         | I   | VCC                                     |

\* PB6: High, PB7: Low → Drawer drive signal

## 2-3. CKDC.III (HD404708) Description

### 1) Outline

The LSI is a 4bit microprocessor developed for the use in the ER-1921/2396. It controls real time clock, key and display. Its basic functions are described below:

**KEY:** Controls max. 253 momentary keys.  
(Sharp 2-key roll over control)  
Simultaneous read of key and switch is possible.  
(When key is read, the states of mode, clock, switch are also buffered. The host can read key and key data simultaneously.)

**Switch:** Mode switch up to 14 positions.  
8 bit clock (cashier) switch  
2 bit feed switch  
1 bit receipt on/off switch  
1 bit option switch  
4 bit general purpose switch (1 bit is used for key board selection.)

**Display:** 16 digit dot display  
12 digit, 7-segment display (Display digit can be selected).  
Decimal point of dot, 7-segment display, indicator  
Blinking control is possible for all digits.  
7 segment programmable pattern: 4 patterns  
7 segment display driver included.

**Buzzer:** One tone control

**Clock:** Year, Month, Day, Day, of week, o'clock, minute

**Alarm:** O'clock, minute

**Interrupt request (event control):**  
Key input, switch state change, alarm generation, counter overflow detection are available.

### 2) System diagram

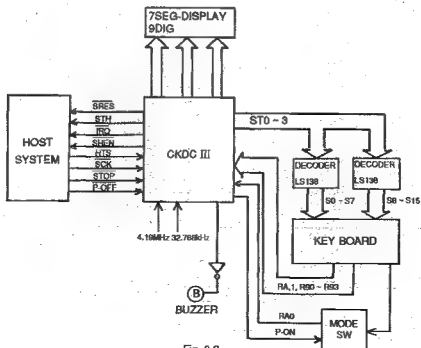


Fig. 2-3

### 3) Pin Assignment

| Pin No. | Port | I/O | Signal name | Notes                                     |
|---------|------|-----|-------------|---|
| 1       | R01  | O   | ■           | SEG-B                                     |
| 2       | R02  | O   | C           | SEG-C                                     |
| 3       | R03  | O   | D           | SEG-D                                     |
| 4       | R10  | O   | E           | SEG-E                                     |
| 5       | R11  | O   | F           | SEG-F                                     |
| 6       | R12  | O   | G           | SEG-G                                     |
| 7       | R13  | O   | —           | NOT USED                                  |
| 8       | R20  | O   | —           | NOT USED                                  |
| 9       | R21  | O   | —           |   |
| 10      | R22  | O   | DP          | DP  |
| 11      | R23  | O   | ▼           | ■   |
| 12      | RA0  | I   | MODER       | MODE RETURN from KEY BOARD UNIT           |
| 13      | RA1  | I   | CFSR        | CLEAR, FEED, SWITCH: RETURN from KEYBOARD |
| 14      | R30  | O   | —           | NOT USED                                  |
| 15      | R31  | O   | —           |   |
| 16      | R32  | O   | —           |   |
| 17      | R33  | O   | —           |   |
| 18      | R50  | O   | ST0         | ST0                                       |
| 19      | R51  | O   | ST1         | ST1                                       |
| 20      | R52  | O   | ST2         | ST2                                       |
| 21      | R53  | O   | ST3         | ST3                                       |
| 22      | INT1 | I   | POFF        | P-OFF signal input                        |
| 23      | INT2 | I   | STOP        | /STOP request signal from HOST CPU input  |
| 24      | R62  | O   | SHEN        | /SHEN output                              |
| 25      | R63  | O   | IRQ         | /IRQ output                               |
| 26      | Vcc  | I   | VDD         | Power supply                              |
| 27      | SCK  | I   | SCK         | /SCK input                                |
| 28      | SI   | I   | HTS         | HTS                                       |
| 29      | SO   | O   | STH         | STH                                       |
| 30      | R43  | I   | —           | NOT USED                                  |
| 31      | BUZZ | O   | BUZZ        | BUZZER                                    |
| 32      | R71  | O   | —           | NOT USED                                  |

| Pin No. | Port  | I/O | Signal name | Notes                          |
|---------|-------|-----|-------------|--------------------------------|
| 33      | R72   | O   | SRES        | SYSTEM RESET                   |
| 34      | R73   | O   | —           |                                |
| 35      | R80   | O   | —           | NOT USED                       |
| 36      | R81   | O   | —           |                                |
| 37      | R90   | I   | R90         | KEY RETURN INPUT from KEY UNIT |
| 38      | R91   | I   | R91         | KEY RETURN INPUT from KEY UNIT |
| 39      | R92   | I   | R92         | KEY RETURN INPUT from KEY UNIT |
| 40      | R93   | I   | R93         | KEY RETURN INPUT from KEY UNIT |
| 41      | RESET | I   | RESET       | CKDC #1 RESET                  |
| 42      | OSC2  | I   | —           | 4.19MHz OSC                    |
| 43      | OSC1  | I   | —           |                                |
| 44      | GND   | —   | —           | GND                            |
| 45      | CL1   | I   | —           | 32.768KHz XTal                 |
| 46      | CL2   | I   | —           |                                |
| 47      | TEST  | I   | VDD         | +5V                            |
| 48      | D0    | O   | —           | NOT USED                       |
| 49      | D1    | O   | —           |                                |
| 50      | D2    | O   | —           |                                |
| 51      | D3    | I   | —           |                                |
| 52      | D4    | O   | —           |                                |
| 53      | D5    | O   | —           |                                |
| 54      | D6    | O   | —           |                                |
| 55      | D7    | O   | G1          | 7SEG DIG1                      |
| 56      | D8    | O   | G2          | 7SEG DIG2                      |
| 57      | D9    | O   | G3          | 7SEG DIG3                      |
| 58      | D10   | O   | G4          | 7SEG DIG4                      |
| 59      | D11   | O   | G5          | 7SEG DIG5                      |
| 60      | D12   | O   | G6          | 7SEG DIG6                      |
| 61      | D13   | O   | G7          | 7SEG DIG7                      |
| 62      | D14   | O   | G8          | 7SEG DIG8                      |
| 63      | D15   | O   | G9          | 7SEG DIG9                      |
| 64      | R00   | O   | A           | SEG-A                          |

## 2-4. Clock generator

The basic pulse circuit is not provided in the ER-1921/2396 itself. An independent oscillation circuit is provided in each device (CPU, CKDC-III)

### 1) $\mu$ PD7811A CPU oscillation circuit (main-PWB)

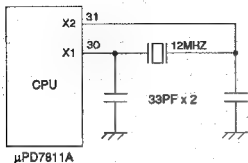


Fig. 2-4

Basic clock is supplied from a 12MHz ceramic oscillator. The CPU contains an oscillation circuit from which the basic clock is internally derived. If the CPU was not operating properly, the signal does not appear on this line in most cases.

### 2) HD4708A73FS CKDC-III oscillation circuit (Display-PWB)

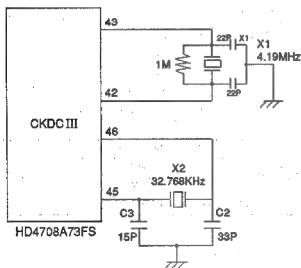


Fig. 2-5

Two oscillators are connected to the CKDC-III. The main clock X1 generates 4.19MHz which is used during power on. When power is turned off or when the MODE switch is set to the OFF position, the CKDC-III goes into the standby mode and the main clock stops. The sub-clock X2 generates 32.768KHz which is primarily used to update the internal RTC (real time clock). During the standby mode, it keeps oscillating to update the clock and monitoring the power recovery.

## 2-5. P-OFF circuit

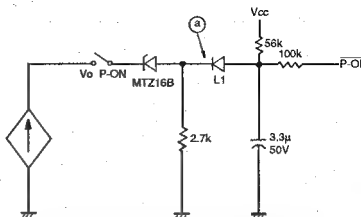


Fig. 2-6

### At power on

When P-ON voltage reaches 16V, the current flows through the zener diode (MTZ16B) so that the level at point @ goes high. The level of P-OFF rises as VCC increases. As a result, the P-OFF signal changes from low to high level.

### At power off

When the power is turned off, the P-ON voltage drops under 15V causing the zener diode to stop current flow, which causes potential at point @ to drop.

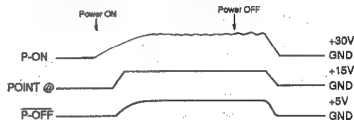


Fig. 2-7

## 2-6. Reset circuit

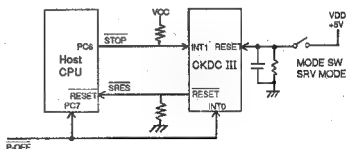
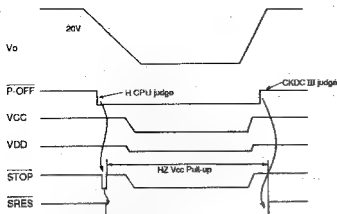


Fig. 2-8



- i) When the host CPU recognizes the power down signal, the reset request signal STOP (H → L) is issued to the CKDCIII after completing a series of power down procedure like saving memory contents and address.  
When the CKDCIII recognizes the STOP signal (H → L), the reset signal SRES (H → L) is issued to the host CPU to go into the standby mode.  
In the standby mode, the clock and calendar data are updated and wait for the power recovery signal.
- ii) When the power supply resumes, the P-OFF signal is set high. When the CKDCIII recognizes the power restoration, the SRES signal is set high and cancels the reset state of the host CPU, and the program is resumed to run. After the host CPU sets V0 mode to ports, it then starts to execute the program immediately power was down.

## 2-7. Battery circuit

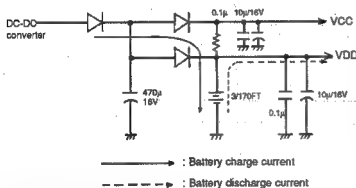


Fig. 2-9

## 2-8. Display control

The CKDCIII has an internal driver to directly drive the fluorescent display tube through the output line.

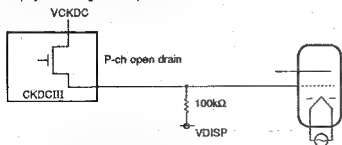


Fig. 2-10

The above figure is an example of the grid driver G<sub>n</sub>. The segment driver has same circuit configuration.

The display tube employs a grid blanking dynamic drive and operates in the following timing.

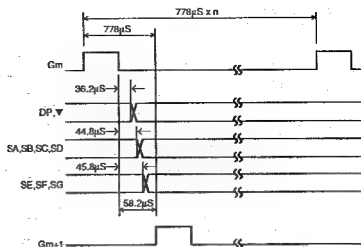


Fig. 2-11

## Printer control

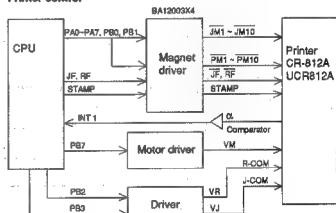


Fig. 2-12

| Signal name |                                |
|-------------|--------------------------------|
| JM1 ~ JM10  | : Journal magnet select signal |
| RM1 ~ RM10  | : Receipt magnet select signal |
| JF          | : Journal feed signal          |
| RF          | : Receipt feed signal          |
| STAMP       | : Stamp signal                 |
| α           | : Printer interface signal     |
| VM          | : Motor drive signal           |
| R-COM       | : Receipt common signal        |
| J-COM       | : Journal common signal        |

## Printer motor drive circuit

### BLOCK diagram

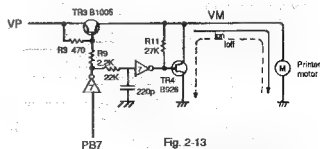


Fig. 2-13

A high on PB7 makes TR3 active and TR4 inactive so that current I<sub>on</sub> flows through the motor to run. On the other hand, a low on PB7 turns off TR3 and turns on TR4 so that I<sub>off</sub> flows through the motor to stop the motor.

## Drawer control

[Without option drawer]

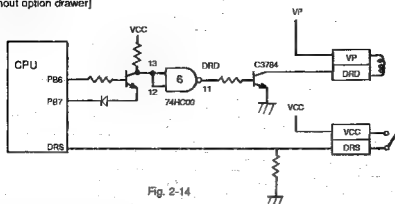


Fig. 2-14

The DRD signal output from the pin 11 of the 74HC00 drives C378K to apply current to the drawer magnet.

[With option drawers]

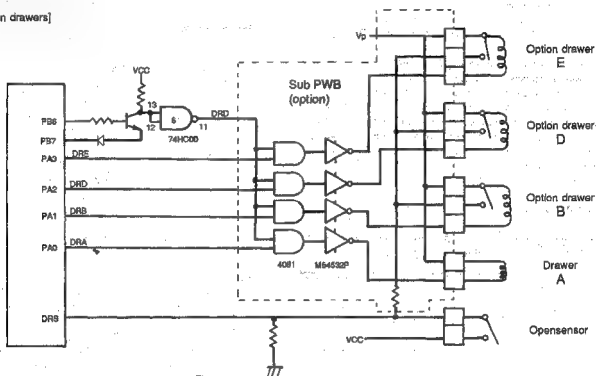


Fig. 2-15

In case an optional drawer is in use, drawers are driven by the DRD signal issued from the pin 11 of the 74HC00 and DRA through DRE. A spark killer diode is contained in the M54532P.

## Power supply circuit

1) Block Diagram

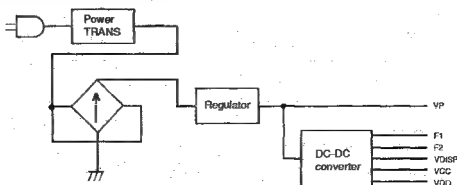


Fig. 2-16

VP : +20V  
 F1 : -4.3VAC  
 F2 : -4.3VAC  
 VDISP : -25V  
 VCC : +5V  
 VDD : +5V

## 2) Regulator circuit

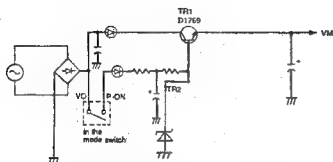


Fig. 2-17

- 1) If VC-P-ON was not shorted within the mode switch (power off), TR1 remains inactive as no voltage is applied to the base of TR1.
- 2) If VC-P-ON was shorted, TR1 comes active as voltage is added to the base of TR1.
- 3) With activation of TR1, the voltage VM begins to increase.

## 3) DC-DC converter

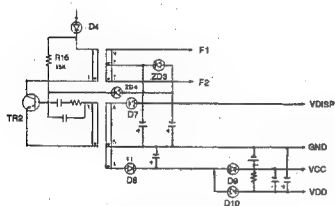
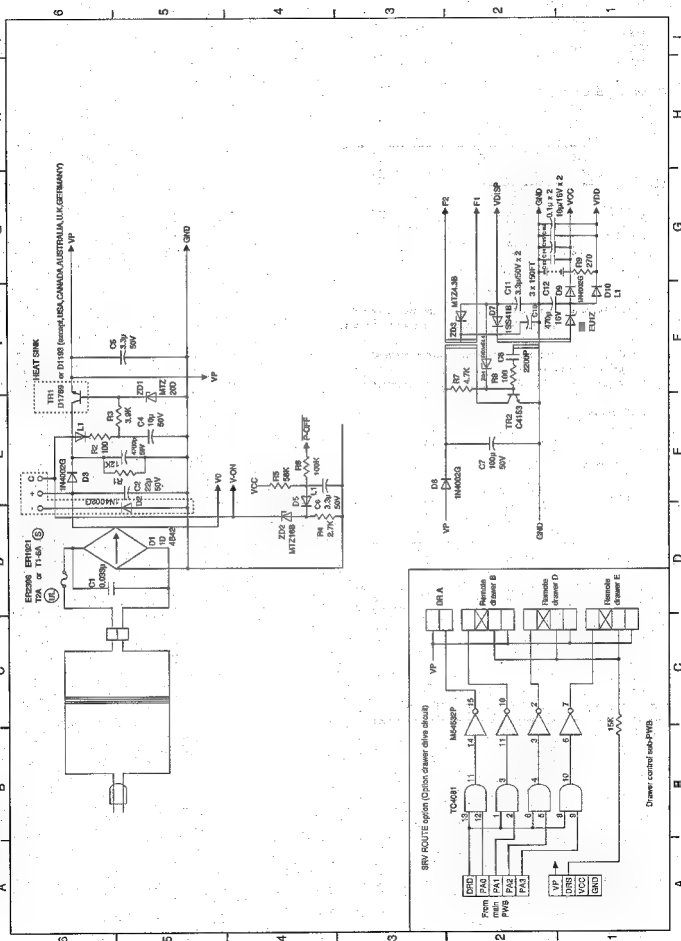


Fig. 2-18

The bias is added to the base of TR2 when the power switch is turned on, so that TR2 starts self-oscillation. VDISP from the secondary side is fed back through the zener ZD4 to suppress voltage fluctuation on the secondary side.

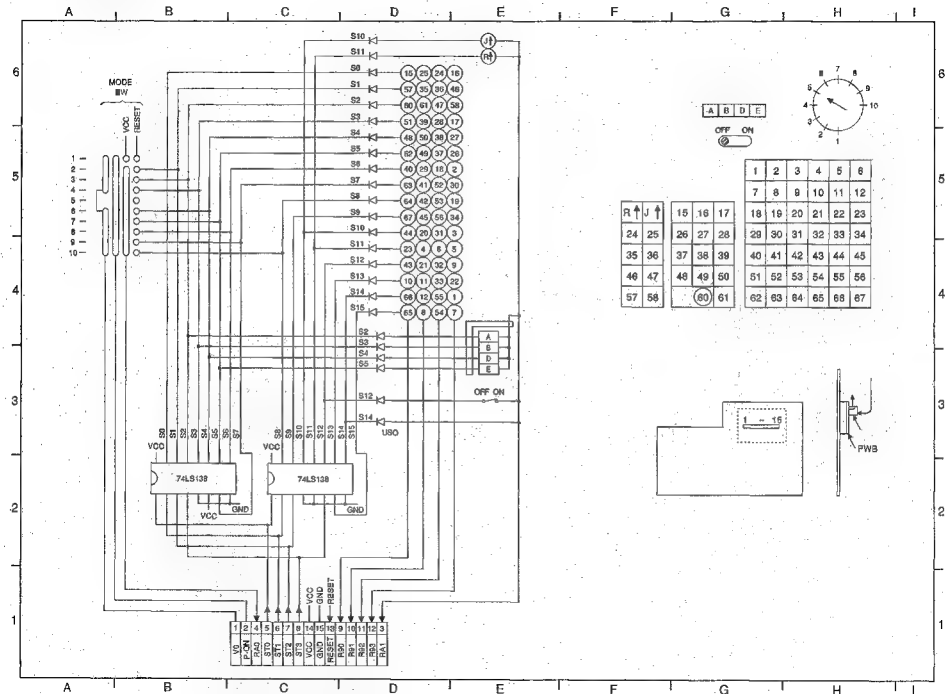
3-1. Main PWB circuit (1/2)

## 3. CIRCUIT DIAGRAM (ER-1921/ER-2396)

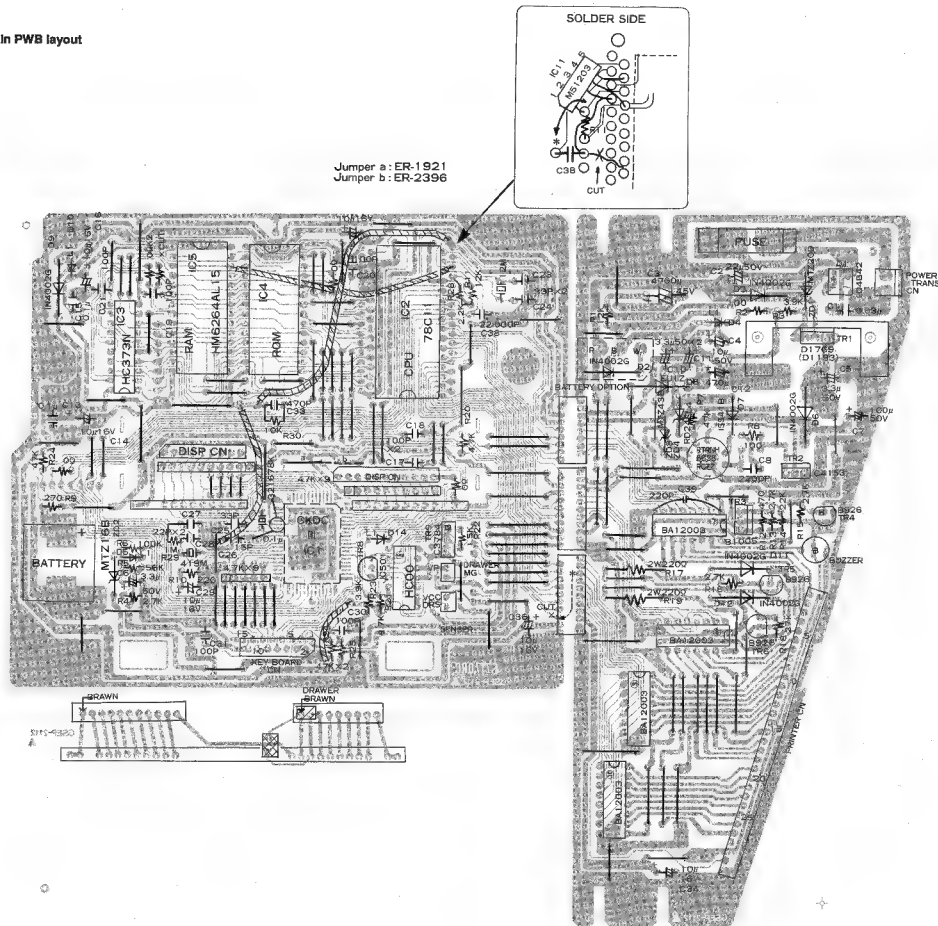




### 3-3. KEYBOARD CIRCUIT



### 3-4 Main PWB layout



### III. INSTALLATION MANUAL FOR OPTIONS

#### 1. LIST OF OPTIONS (Sales route options)

##### 1) For ER-1911

| No. | Name            | Model name   | Country |      |           | Notes   |
|-----|-----------------|--|---------|------|-----------|---|
|     |                 |  | Germany | U.K. | Australia |   |
| 1   | Coin case       | ER-35CC1<br>ER-38CC                                      | ○       | ○    | —         |   |
| 2   | Coin case cover | ER-37CV1-5<br>ER-38CV1-5                                 | ○       | ○    | ○         |   |
| 3   | Key top kit     | ER-11KT6<br>ER-12KT6<br>ER-22KT6<br>ER-11DK6<br>ER-51DK6 | ○       | ○    | ○         | 1 X 1 key top<br>1 X 2 key top<br>2 X 2 key top<br>1 X 1 dummy key<br>1 X 5 dummy key |
| 4   | Option battery  | ER-20BT2   | —       | ○    | ○         |   |

##### 2) For ER-1921

| No. | Name            | Model name   | Country |      |           | Notes   |
|-----|-----------------|--|---------|------|-----------|---|
|     |                 |  | Germany | U.K. | Australia |   |
| 1   | Coin case       | ER-19CC<br>ER-35CC1<br>ER-38CC                           | ○       | —    | —         |   |
| 2   | Coin case cover | ER-19CV1-5<br>ER-37CV1-5<br>ER-38CV1-5                   | ○       | —    | —         |   |
| 3   | Key top kit     | ER-11KT6<br>ER-12KT6<br>ER-22KT6<br>ER-11DK6<br>ER-51DK6 | ○       | ○    | ○         | 1 X 1 key top<br>1 X 2 key top<br>2 X 2 key top<br>1 X 1 dummy key<br>1 X 5 dummy key |
| 4   | Option battery  | ER-20BT2   | ○       | ○    | ○         |   |

##### 3) For ER-2386/ER-2396

| No. | Name           | Model name   | Model   |         | Notes   |
|-----|----------------|--|---------|---------|---|
|     |                |  | ER-2386 | ER-2396 |   |
| 1   | Coin case      | ER-35CC  | ○       | ○       |   |
| 2   | Key top kit    | ER-11KT6<br>ER-12KT6<br>ER-22KT6<br>ER-11DK6<br>ER-51DK6 | ○       | ○       | 1 X 1 key top<br>1 X 2 key top<br>2 X 2 key top<br>1 X 1 dummy key<br>1 X 5 dummy key |
| 3   | Option battery | ER-20BT2   | ○       | ○       | Except. U.S.A.  |

#### 2. LIST OF OPTIONS (Service route options)

##### 1) For ER-1911/ER-1921

| No. | Name                    | Parts code                                      | Model   |         | Notes                                      |
|-----|-------------------------|---|---------|---------|--|
|     |                         |   | ER-1911 | ER-1921 |  |
| 1   | Remote drawer           | GBOXD7048RCZZ<br>GBOXD7049RCZZ<br>GBOXD7050RCZZ | —       | ○       | For Germany<br>For U.K.<br>For Australia   |
| 2   | Drawer open sensor kit  | DKIT-8325RCZZ                                   | ○       | —       | Excluding U.K.                             |
| 3   | Drawer fixing kit       | DKIT-8633RCZZ                                   | ○       | ○       |  |
| 4   | Shield plate kit        | DKIT-8381RCZZ                                   | ○       | ○       | ER-1911 the bottom cabinet kit is required |
| 5   | Cashier key kit         | DKIT-3383RCZZ                                   | —       | ○       |  |
| 6   | SRV key                 | LKGIM7113RCZZ                                   | ○       | ○       | Service key                                |
| 7   | Key cover               | GCOVB6985RCZZ                                   | ○       | ○       |  |
| 8   | Remote drawer drive kit | DKIT-8323RCZZ                                   | —       | ○       |  |
| 9   | OP key grip cover       | LKGIM7126RCZZ                                   | ○       | ○       |  |
| 10  | Sub master key          | LKGIM7129RCZZ                                   | ○       | ○       |  |
| 11  | Drawer bell kit         | DKIT-8324RCZZ                                   | ○       | ○       |  |

##### 2) For ER-2386/ER-2396

| No. | Name                    | Parts code    | Model   |         | Notes |
|-----|-------------------------|---------------|---------|---------|-------|
|     |                         |               | ER-2386 | ER-2396 |       |
| 1   | Remote drawer           | GBOXD7010RCZZ | —       | ○       |       |
| 2   | Drawer open sensor kit  | DKIT-8325RCZZ | ○       | ○       |       |
| 3   | Drawer fixing kit       | DKIT-8633RCZZ | ○       | ○       |       |
| 4   | Shield plate kit        | DKIT-8381RCZZ | —       | ○       |       |
| 5   | SRV key                 | LKGIM7113RCZZ | ○       | ○       |       |
| 6   | Key cover               | GCOVB6985RCZZ | ○       | ○       |       |
| 7   | Blind cover             | DKIT-8567RCZZ | ○       | ○       |       |
| 8   | Remote drawer drive kit | DKIT-8323RCZZ | —       | ○       |       |
| 9   | OP key grip cover       | LKGIM7126RCZZ | ○       | ○       |       |

### 3. INSTALLATION OF OPTIONS

#### 3-1. Drawer fixing kit

The drawer fixing kit is used for securing the cash drawer when installing separately from the ECR main unit.

By using two of brackets, the drawer box can be protected from drifting especially when it is filled with coins.

##### 1) Parts list

KIT CODE: DKIT-8633RCZZ

| No. | Parts code    | Description                                      | Price rank | Qty |
|-----|---------------|--|------------|-----|
| 1   | LBRC-2321RCZZ | Fixing bracket                                   | AN         | 1   |
| 2   | XTPSD40P16000 | Tapping screw M4 x 16                            | AA         | 4   |
| 3   | XBSSD40P16000 | Flat head screw M4 x 16<br>(For remote drawer)   | AA         | 2   |
| 4   | XUSSD40P20000 | Flat head screw M4 x 20<br>(For standard drawer) | AA         | 2   |
| 5   | XBPSD40P22000 | Screw M4 x 22                                    | AA         | 4   |
| 6   | XNED40-32000  | Nut M4 x 32                                      | AA         | 4   |

## 2) Installation procedure

- Turn over the drawer bottom side and remove rubber footing at tow locations.

- Fasten the bracket together with the rubber footing using the pan head screw.

Pay attention for the installing direction of the bracket that the pan head screw can be inserted properly into the bracket.

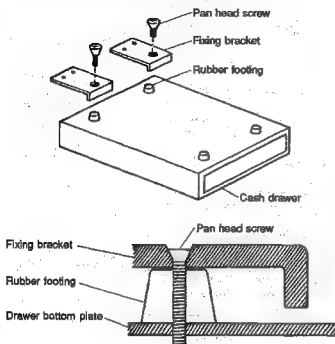


Fig. 3-1

- Fastening on the table:

Secure the fixing Bracket using the screw (Fig. 3-2).

If the thickness of the table is less than 15mm, bore a 4.5mm hole in the table and fasten it with the screw (XBPSD40P22000 - 4 pcs.) and nut (XNESD40-32000 - 4pcs.)

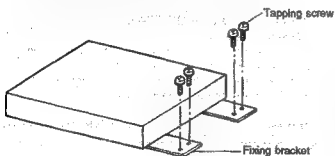


Fig. 3-2

## 3-2. Blind cover kit (For ER-2386/2396)

The blind cover kit is used for masking the open slot (located at the bottom side of the drawer box) of the drawer manual open lever.

- Component parts KIT CODE: DKIT-8567RCZZ

| No. | Parts code    | Description       | Price rank | Q'ty |
|-----|---------------|-------------------|------------|------|
| 1   | GITAR6732RCZZ | Blind cover plate | AK         | 1    |
| 2   | XBPSD30P06KS0 | Screw M3 x 6      | AA         | 1    |

## 2) Installation procedure

- Secure the blind cover from the bottom side of the drawer by using a screw holding the drawer bottom plate by the washer.

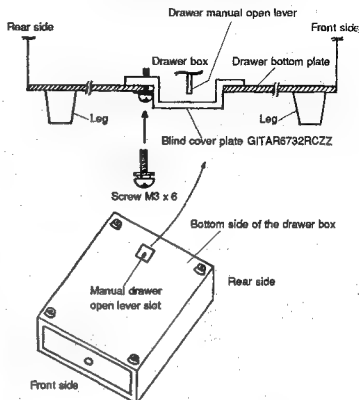


Fig. 3-3

## 3-3. Drawer removal procedure (For ER-1911/1921 and ER-2396)

- Items required by models and destination

| Model name | Items required   | Destination      |
|------------|------------------|------------------|
| ER-1921    | Shield plate kit | Bottom cabinet   |
| ER-1911    | DKIT-3381RCZZ    | Installed on ECR |
| ER-1911    | DKIT-3381RCZZ    | GCABA7081RCZZ    |
| ER-2396    | DKIT-3381RCZZ    | Installed on ECR |
|            |                  | US and Canada    |

When removing the drawer from the ER-1911, the bottom cabinet kit is required in addition to the shield plate kit (DKIT-3381RCZZ).

- Parts list

- Shield plate kit (DKIT-3381RCZZ)

| Parts code    | Description       | Price rank | Qty | Remark  |
|---------------|-------------------|------------|-----|---|
| DUNIT9207RCZZ | Shield plate unit | AZ         | 1   |   |
| GLEGG6634RCZZ | Rubber foot       | AB         | 4   |   |
| XUBSD30P14000 | Screw             | AA         | 4   | For rubber foot                                 |
| XWHSD30-05080 | Washer            | AA         | 4   | For rubber foot                                 |
| XUBSD30P08000 | Screw             | AA         | 1   | For shield plate                                |
| XBPSD30P9K50  | Screw             | AA         | 1   | For installation of the ER-1911 transformer.    |
| XFPSD30P20000 | Screw             | AA         | 1   | For installation of the ER-1911 printer.        |
| XWHSD30-05080 | Washer            | AA         | 1   | For installation of the ER-1911 printer.        |
| LX-BZ6756RCZZ | Screw             | AA         | 1   | For installation of the ER-1911 bottom cabinet. |
| XBPSD30P20K50 | Screw             | AA         | 1   | For installation of the ER-1911 ring core.      |
| XNESD30-24000 | Nut               | AA         | 1   | For installation of the ER-1911 ring core.      |
| LBSHC8638RCZZ | Clamp             | AA         | 1   |   |
| FLAS8871RCZZ  | Inst manual       | AE         | 1   | *1  |

\*1 From '90 Oct. production

## ② Bottom cabinet

| No. | Parts code    | Description    | Price rank | Qty |
|-----|---------------|----------------|------------|-----|
| 1   | GCABA7081RCZZ | Bottom cabinet | BA         | 1   |

## 3) Procedure

| No. | Description   | Applicable model<br>ER-1921<br>ER-2395<br>ER-1911 | Parts name   | Parts code   |
|-----|---|---|--|--|
| 1   | Remove three top cabinet holding screws.  | ○ ○   |  |  |
| 2   | Remove the grounding wire from the top of the drawer.   | ○ ○   |  |  |
| 3   | Remove the ring core from the cabinet.  | ○ ○   |  |  |
| 4   | Remove the top cabinet from the bottom cabinet.<br>Remove the top cabinet from the drawer. Unfasten the transformer and drawer connectors.  | ○ ○   |  |  |
| 5   | Remove two bottom cabinet holding screws.   | ○ ○   |  |  |
| 6   | Remove the transformer holding screw.   | ○ ○   |  |  |
| 7   | Remove the transformer cover from the drawer.   | ○ ○   |  |  |
| 8   | Get the bottom cabinet ready. Use the bottom cabinet that equipped to the ER-1921 and ER-2395.  | ○ ○   | Bottom cabinet   | GCABA7081RCZZ  |
| 9   | Insert the wire of the drawer solenoid microswitch in the clamp and install the clamp to the shield plate. Note that there is a microswitch wire provided for use with the UK version model.<br>Note: Even for the drawer with no microswitch it is necessary to install a clamp to the shield plate without fail.<br>This means that two clamps must be installed without exception. | ○ ○   | Clamp  | LBSHC6638RCZZ  |
| 10  | Route the solenoid microswitch connector through the square hole beneath the bottom cabinet.  | ○ ○   |  |  |
| 11  | Place the shield plate under the back of the bottom cabinet, and fasten the rubber footings with screw at four locations and at a center.   | ○ ○   | Shield plate unit<br>Rubber footing<br>Washer<br>Screw for rubber footing<br>Screw | DUNY9207RCZZ (91TAU674RCZZ)<br>TUBS6668RCZZ<br>GLEGG66534RCZZ<br>XWHS030-05080<br>XUBSD30P14000<br>XUBSD30P08000 |
| 12  | Install the transformer cover to the rear right of the bottom cabinet and fasten the transformer with screws. (Use new screw for the ER-1911.)  | ○ ○   | Screw  | XBPSD30P35KSO  |
| 13  | Replace the top cabinet to the bottom cabinet. Fasten the transformer and drawer connectors at this point.  | ○ ○   |  |  |
| 14  | Fasten the grounding wire.  | ○ ○   |  |  |
| 15  | Fasten the ring core.<br>(Use new screw and nut.)   | ○ ○   | Screw<br>Nut   | XBPSD30P20KSO<br>XNESD30-24000   |
| 16  | Fasten the top cabinet with three screws. Use a new screw for the printer of the ER-1911 and for the one in the rear left.  | ○ ○   | Screw, printer<br>Screw, rear left   | XFPSD30P20000<br>XWHS030-05080<br>LX-BZ6756RCZZ  |

Tailor the drawer solenoid microswitch wire to the size the user wants. Use the AWG22 wire for this.

## 4) Setting

Master reset

While pressing the journal feed key, rotate the MODE switch from SRV2 to SRV1 position.

## ER-1911

• Removal of the ER-1911 top cabinet transformer

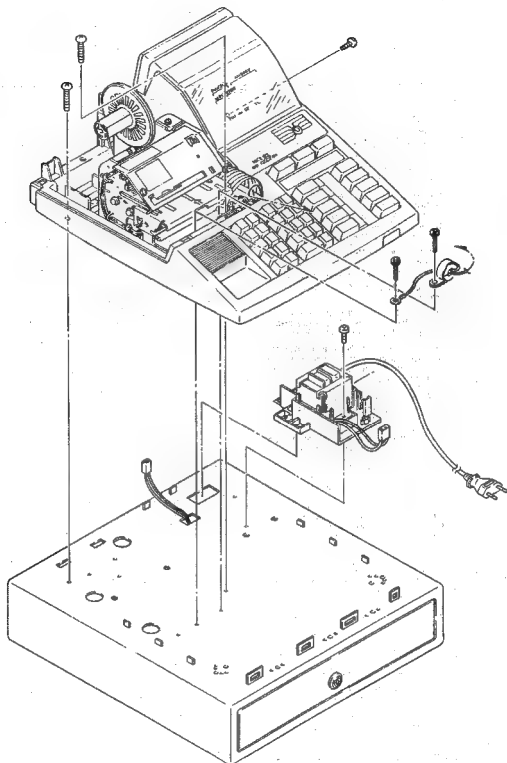


Fig. 34

## ER-1911

• ER-1911 assembly procedure

### Bottom cabinet

The bottom cabinet is not equipped as standard for the ER-1911

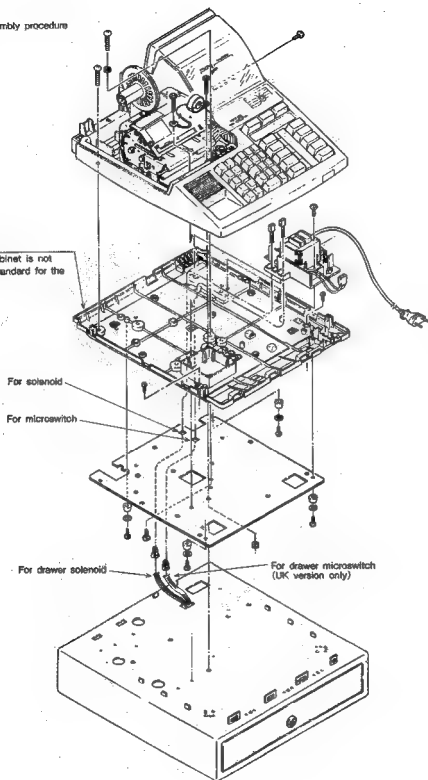


Fig. 3-5

## ER-1921, ER-2396

- Removal of the ER-1921 and ER-2396 top cabinet, transformer, and bottom cabinet.
- ER-1921 and ER-2396 assembly procedure

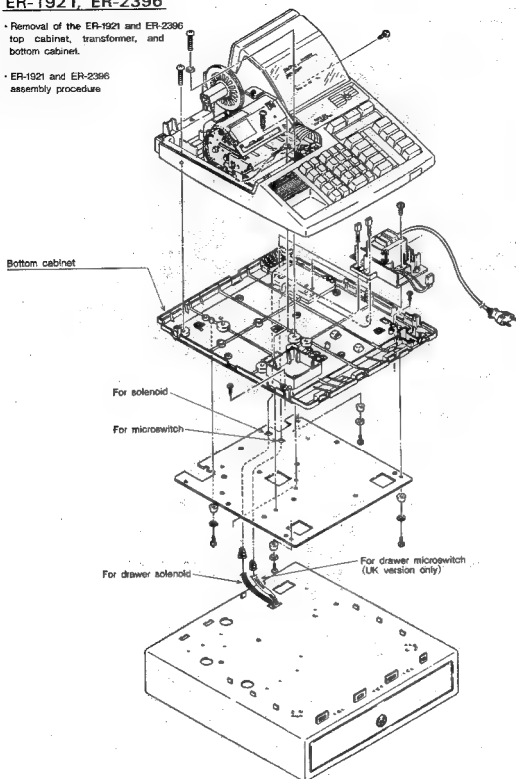


Fig. 3-6

### 3-4. Remote drawer and remote drawer drive kit for ER-1921 and ER-2396

#### 1) Parts list

##### Remote drawer

| No. | Parts code    | Model   | Country   |
|-----|---------------|---------|-----------|
| 1   | GBOXD7048RCZZ | ER-1921 | Germany   |
| 2   | GBOXD7049RCZZ | ER-1921 | U.K.      |
| 3   | GBOXD7050RCZZ | ER-1921 | Australia |
| 4   | GBOXD7010RCZZ | ER-2396 | U.S.A.    |

#### DKIT-8323RCZZ

| No. | Parts code    | Description     | Price rank | Qty |
|-----|---------------|-----------------|------------|-----|
| 1   | CPWBF7055RC01 | Drawer PWB      | AT         | 1   |
| 2   | PSHEF6714RCZZ | Sheet           | AC         | 1   |
| 3   | PSPAY6643RCZZ | Spacer          | AD         | 1   |
| 4   | QCNCM6865RC0D | 4-pin connector | DB         | 1   |
| 5   | QCNCM6865RC0E | 5-pin connector | DE         | 1   |
| 6   | XUBSD30P08000 | Screw M3 x 8    | AA         | 6   |
| 7   | XUPSD30P25000 | Screw M3 x 25   | AA         | 1   |

NOTE: Modification is needed in the drawer PWB to use the drawer drive kit (DKIT-8323RCZZ) for the ER-1921 and ER-2396.

#### (1) Modification method

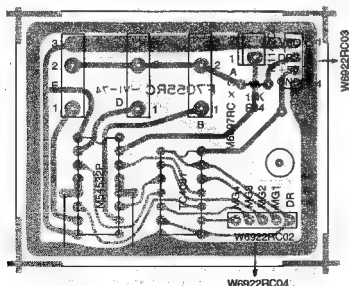
- ① First, remove the 4-pin and 5-pin connector cables that attached to the drawer PWB and replace them with the new cable.

4-pin connector cable: QCNCW6922RC03

5-pin connector cable: QCNCW6922RC04

#### ② PWB layout

##### Drawer drive PWB



#### Connector cable for drawer drive PWB.

| No. | Parts code    | Price rank |
|-----|---------------|------------|
| 1   | QCNCW6922RC03 | AG         |
| 2   | QCNCW6922RC04 | AH         |

#### Screw (M3x30) for install the drawer drive PWB.

| No. | Parts code    | Price rank |
|-----|---------------|------------|
| 1   | XUPSD30P30000 | AA         |

#### 2) Installation procedure

- ① Remove the top cabinet from bottom cabinet.
- ② Remove the keyboard from top cabinet.
- ③ Install the drive PWB unit on the keyboard.

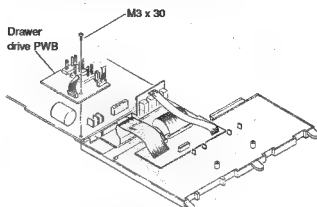
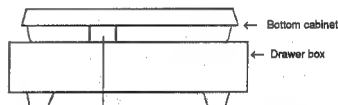


Fig. 3-7

- ④ Break through the cover located on the rear side of the bottom cabinet.



Break through the cover

Fig. 3-8

- ⑤ Route the drawer cable through the cover located.
- ⑥ Connect the drawer cable to the drive PWB and the drive PWB cable to the main PWB.

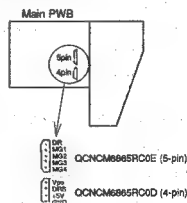


Fig. 3-9

- ⑦ Remove the option drawer cable holder at a on the bottom cabinet install the remote drawer cable with the cable holder.

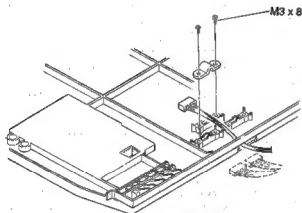
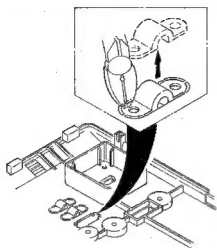


Fig. 3-10

- ⑧ Install the keyboard and top cabinet.

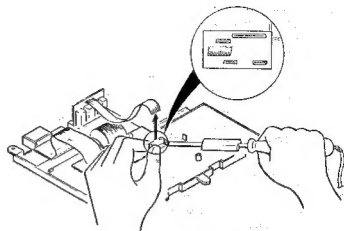
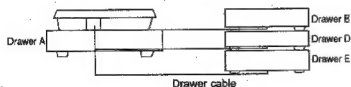


Fig. 3-11

- ⑨ Mount the keybody into the clerk key box on the bottom cabinet.

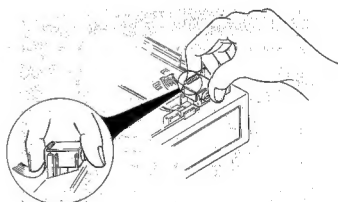


Fig. 3-12

- ⑩ Bond the switch panel (HDECA6811RCZZ) to the lower cabinet and fasten the ground strap with the screw.

### 3-5. Cashier real key kit (one-hole key) only ER-1921

#### 1) Parts list DKIT-3383RCZZ

| No. | Parts code     | Description                   | Price rank | Q'ty |
|-----|----------------|-------------------------------|------------|------|
| 1   | HDECA6810RCZZ  | Decoration panel              | AG         | 1    |
| 2   | HDECA6811RCZZ  | SW panel                      | AP         | 1    |
| 3   | QCNCM8865RC0E  | 5-pin connector               | AB         | 1    |
| 4   | QCNCW-7160RCZZ | Ground wire                   | AB         | 1    |
| 5   | QSW-Z6851RCZZ  | Key body with cable & key set | BA         | 1    |
| 6   | XBPSD30P06000  | Screw                         | AA         | 1    |
| 7   | XFPSD30P06000  | Screw                         | AA         | 1    |
| 8   | GFTAB6754RCZA  | Real key cover                | AK         | 1    |

#### 2) Installation procedure

- Remove the top cabinet from the bottom cabinet
- Remove the main PWB and keyboard unit from the top cabinet
- Replace the connector of the keyboard PWB and insert the connector of the CLERK switch.
- Remove the 4-row push CLERK switches which are found on the keyboard frame.

- ⑦ When the drawer is connected.

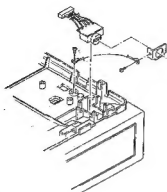


Fig. 3-13

- ⑧ When the drawer is separated.

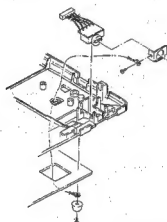


Fig. 3-14

- ⑨ Replacement of the decoction panel.

Strip off the current mode switch panel and affix the mode switch panel (HDECA6810RCZZ) in place of the old one.

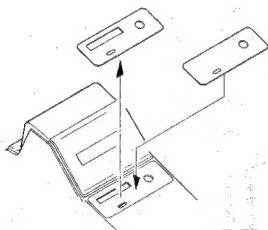


Fig. 3-15

- ⑩ Remove the clerk key hole cover located at the front and right side of the top cabinet.

- ⑪ Install the top cabinet  
⑫ Install the real key cover (GFTAB6754RCZA) to the top cabinet.



Fig. 3-16

### 3-6. Drawer bell and open sensor kit

#### 3-6-1. Drawer bell kit

##### 1) Parts list

DKIT-8324RCZZ

| No. | Parts code    | Description  | Price rank | Q'ty |
|-----|---------------|--------------|------------|------|
| 1   | 0AGRAL202MKSS | Bell         | AC         | 1    |
| 2   | 0AGMLF230MKSS | Hammer unit  | AC         | 1    |
| 3   | 0AGXBD806408N | Screw M4 x 6 | AA         | 1    |
| 4   | 0AGXBD801408W | Screw M4 x 8 | AA         | 1    |

##### 2) Installation procedure

- ① Remove the drawer bottom plate by unscrewing the 4-screws.  
② Install each component 1 to 4 as illustrated in Fig. 3.

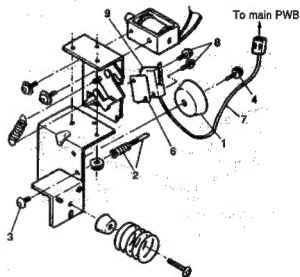


Fig. 3-17

#### 3-6-2. Drawer open sensor kit

##### 1) Parts list

DKIT-8325RCZZ

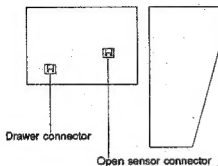
| No. | Parts code    | Description               | Price rank | Q'ty |
|-----|---------------|---------------------------|------------|------|
| 5   | QCNCM5035BCZZ | 2-pin connector           | AB         | 1    |
| 6   | 0AGPSP200MKSS | Spacer                    | AB         | 1    |
| 7   | 0AGOCW230MKSS | 2-pin connector with wire | AE         | 1    |
| 8   | 0AGXBD202314X | Screw M3 x 14             | AA         | 2    |
| 9   | 0AGOSW201MKSS | Micro switch              | AM         | 1    |

Note: The 2-pin connector (No.5) has been already installed for the models ER-1910 and ER-1920. Therefore, skip the steps ② and ③ in the installation procedure. And the 2-pin connector is not used in this case.

## 2) Installation procedure

- ① Remove the top cabinet.
- ② Remove the main PWB and solder the 2-pin connector onto the main PWB.

ER-1911, ER-2386 Main PWB



ER-1921, ER-2396 Main PWB

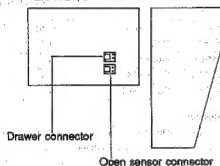


Fig. 3-18

- ③ Replace the main PWB.
- ④ Solder the 2-pin connector cable (0AGQCW230MKSS) to the micro switch as shown Fig.3-19.

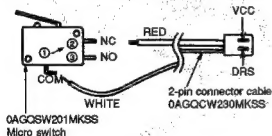


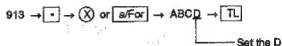
Fig.3-19

- ⑤ Remove the drawer bottom plate.
- ⑥ Mount the micro switch to the lock unit using the spacer and tooth screws. See Fig. 3-17. (No.6-9)
- ⑦ Draw the connector cable and put into the same hole used for the drawer cable, then insert to the connector.
- ⑧ Replace the drawer bottom plate and the top cabinet.
- ⑨ SRV programming (Job #913-D)  
Change the service preset value as it requires at SRV mode.

913-D: 1. Drawer closing operation  
2. Error system  
3. Key catch sound

| 1.Drawer closing operation | 2.Error system       | 3.Key catch sound | 913-D |
|----------------------------|----------------------|-------------------|-------|
| Non compulsory             | All lock error       | Exist             | 0     |
|                            |                      | Not exist         | 1     |
|                            | Mis-ope & lock error | Exist             | 2     |
|                            |                      | Not exist         | 3     |
| Compulsory*                | All-lock error       | Exist             | 4     |
|                            |                      | Not exist         | 5     |
|                            | Mis-ope & lock error | Exist             | 6     |
|                            |                      | Not exist         | 7     |

[Key operation]



## 3-7. Key top kit

### 1) List of key top kit

| No. | Name     | Description    |
|-----|----------|----------------|
| 1   | ER-11KT6 | 1 x 1 key top  |
| 2   | ER-12KT6 | 1 x 2 key top  |
| 3   | ER-22KT6 | 2 x 2 key top  |
| 4   | ER-11DK6 | 1 x 1 Dummykey |
| 5   | ER-51DK6 | 5 x 1 Dummykey |

### 2) Installation procedure

#### ① ER-11KT6

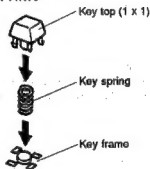


Fig. 3-20

#### ② ER-12KT6

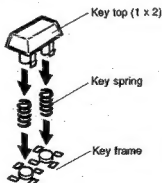


Fig. 3-21

③ ER-22KT6

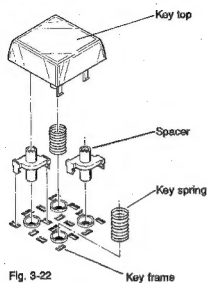
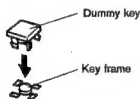


Fig. 3-22

④ Dummy key:



3) Removing key top

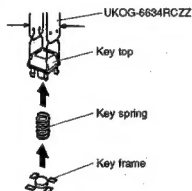


Fig. 3-23

4) SRV programming

JOB #904-A, B : Number of departments.

#### 4. SERVICE PRECAUTION

When removing the top cabinet, lift it up in the first place as illustrated, then remove the transformer cable and remove the top cabinet.

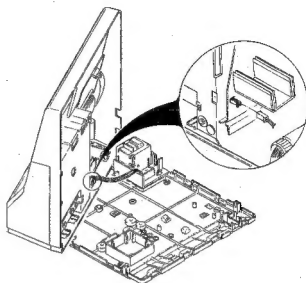


Fig. 4-1